

Time for a Change-Out

Power pros don't just keep the electricity flowing on base, they also operate and maintain the barrier systems that are on ready status anytime an aircraft is in the air.

by TSgt Jeff Hufford
100th CES

From keeping power facilities up and running to maintaining aircraft arresting systems (cables and barriers) that save lives and aircraft, Air Force civil engineer electrical power production personnel, or "power pros," are a multifaceted career field specialty. As in other civil engineer squadrons, the 100th CES power pro section installs, operates and overhauls electrical generating power production plants and equipment along with the base's aircraft arresting systems (AAS). They recently accomplished a 10-year overhaul and change-out of the AAS in April.

Generating Work

The 100th CES' eight-man power pro shop, seven military and one civilian, supports the entire Royal Air Force Mildenhall, England, community with emergency backup power. The base has approximately 30 commercial generators,

ranging from 8 to 350 kilowatts each. These are used to support critical facilities such as the wing command post, base communications, the air control tower and others.

The generators are completely automatic in that they sense the presence of commercial power. When one phase of power senses a drop in voltage or frequency, the automatic transfer panel (ATP) will start the genera-

tor and transfer the commercial power to generator power. Once power is restored and a preset timer times out, the ATP will automatically switch back to commercial power and shut down the generator.

Power production personnel are required to test these generators once a month under building load to ensure 100 percent reliability. Because of their minimal manning and the number of generators they support on base, they also train the users on how to operate the generators in the event of a total power outage.

The team also supports numerous scheduled power outages each year, while base electricians perform periodic maintenance on electrical distributions and transformers. To ensure no degradation to the mission, they have approximately 30 mobile generators, ranging from 5 to 200kw each, that can be installed for affected buildings.

Last year the team supported 20 scheduled power outages, including ones in the dining facility, the local area network system and the commissary, and they expect to support about the same number again this year. Their mobile generators also supported the United Service Organizations (USO) concert tours hosted by the 100th Services Squadron, such as Tonic and Tops in Blue.

The power pros support numerous unscheduled power outages as well. Last year, after a cable was accidentally cut by a contractor, they installed a generator for a dormitory and the Professional Development Center. This occurred at about 4 p.m. on a Friday and it was pouring rain — not the greatest time to install an electrical generator. However, the team knew that to ensure quality of life for dorm residents over the weekend, they had to get it done no matter what.

Power pros perform the same job in wartime, supporting nearly every major operation. Last year the 100th CES sent personnel to Mozambique in support of the African flood relief effort, as well as to Cameroon, Africa, to support Med Flag, a joint military medical exercise. They also provided prime power for operations in Turkey during the Kosovo crisis.



(Top) An F-15's tail hook engages the steel cable of the aircraft arresting system on the runway at RAF Mildenhall, England. (Photo by A1C Rasheen Douglas) (Above) A1C Trezith Smart removes the clutch from the old BAK-12. (100th CES photo)

An Engaging Job

Power pros also operate and maintain the base's AAS. These systems are somewhat like the ones used on Navy aircraft carriers. However, whereas the Navy uses an AAS for every landing on a ship, the Air Force uses them only for emergencies such as total hydraulic failure or hot brakes. The purpose of an AAS is twofold — to save the pilot's life and to save the multimillion-dollar aircraft from skidding off the runway.

The AAS at RAF Mildenhall is comprised of two BAK-12s. They have two rotary friction energy absorbers, also called arresting engines, located on each side of the runway. Each absorber has two four-rotor Bliss brakes mounted on a common shaft along with a 1,200-foot, 7-inch-wide nylon tape storage reel. The nylon tape is directed underground to the edge of the runway and through a deck-sheave or fairlead beam used to direct the tape path along the runway edge and avoid conflict with runway edge lights. The tape is then connected to a 1.25-inch steel cable that is connected to the purchase tape and absorber on the opposite side of the runway. The cable is elevated 2 inches off the runway surface to accommodate engagement with a fighter plane's tailhook.

In the event of an in-flight emergency (IFE), the pilot lowers the plane's tailhook before landing. The tailhook engages the steel cable, paying out the stored 1,200-foot nylon tape. As the absorbers' storage reels on both sides of the runway begin turning, the common

shaft drives a hydraulic pump and a gear reducer through chains, developing hydraulic brake pressure that is controlled by a gland and a

needle valve. The pressure applied to the brakes creates friction and, much like the system in your car, the energy of the aircraft's forward momentum is converted to heat, slowing the aircraft to a smooth, safe stop.

After the aircraft is disengaged by transient alert and fire department personnel, the AAS is rewound by gasoline engines in approximately three minutes, ready for the next emergency. Total operation time from aircraft engagement to complete rewind is approximately 10-20 minutes, depending on the length of aircraft runout. The operation is a complete team effort, relying on communication between air control tower, fire department, transient alert and barrier maintenance personnel.

The BAK-12 AASs are capable of arresting tailhook-equipped aircraft at a nominal weight and speed of 50,000 pounds at 180 knots. Random cable failures occur at speeds exceeding 180 knots.

The BAK-12 energy absorbers are overhauled every 10 years as part of their periodic maintenance. They are recertified each year by aircraft engagement at approximately 90 knots. The annual certification engagement is accomplished to ensure the integrity and safe operation of the system.

The arresting systems at RAF Mildenhall are maintained to ensure an alternate divert location for RAF Lakenheath's fighter mission. In the event of an IFE on Lakenheath's runway, Mildenhall's barrier maintenance team is given approximately six minutes to rush from wherever they are on base to the runway to install the cable in case RAF Lakenheath's fighters are diverted. The team has received many accolades from RAF Lakenheath commanders as well as RAF Mildenhall's air control tower and base operations for breaking their own records, activating the AAS within three minutes.

Mission Ready

Power pros are always on call. With responsibility for the base's emergency electrical power and aircraft arresting systems, that call can come at all hours of the day and night. But with that responsibility comes great personal satisfaction in doing what it takes to support the mission.

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SSgt Karl Danforth connects a load cable to a MEP 7 (mobile electric power) generator. (100th CES photo)



SSgt Andrew Franks, 100th CES Heavy Repair, uses a crane to hoist the old BAK-12 system out. (Photo by SSgt Karl Danforth)